MicroScout® Service
MicroScout® Plus Service

CONDUCTIVITY ENDURANCE IN COMPLEX FRACTURE GEOMETRIES

OVERVIEW
The Halliburton MicroScout® service is the first to provide a means of extended stimulation of unconventional reservoir microfractures for increased recovery of hydrocarbons. Enhanced propping agents that are added to the fracturing fluid in specialized stages help ensure that naturally occurring or stimulation-induced microfractures remain open during production and contribute to greater reservoir drainage volume. For even further stimulation, the MicroScout Plus service provides deeper penetration into the formation for increased conductive complexity.

MAXIMIZING RESERVOIR COMMUNICATION TO THE WELLBORE
Unconventional fracture stimulation designs can create an extensive active fracture network. Key design aspects help ensure that primary fractures are propped and that the near-wellbore area is open and communicating to the wellbore. Connecting with the natural fracture network and enhancing the number of open and contributing secondary fractures further improve reservoir drainage volume. However, increasing the number of secondary fractures that remain open for the long term during production is challenging.

MicroScout service provides conductivity for secondary fractures too small to be propped by conventional frac sand. Placement of proppant, even 200-mesh sand, into natural fractures and microfractures is difficult due to low leakoff fluid velocities. MicroScout service places fine particulates, smaller than 200-mesh size, which can enter the secondary fractures without bridging or screening out at the entrances. After placed inside the microfractures, the low concentration of microsphere particulates helps form partial monolayers, which help prevent the complete closure of microfractures and can provide conductive flow paths connecting the complex fracture network to the primary fractures. These propped microfracture networks enhance the complexity and reach of the stimulation fracture network.

MICROSCOUT PLUS SERVICE: FURTHER ENHANCEMENT OF STIMULATED COMPLEXITY
Fracture network complexity, both natural and stimulation-induced, is prevalent in most unconventional reservoirs. MicroScout service has contributed to improved production from secondary fractures. However, there are fractures that are too small to be treated by MicroScout service and that are left unstimulated, limiting their ability to contribute to long-term production.

To further enhance matrix stimulation, Halliburton developed MicroScout Plus service, which is designed to penetrate deeper into the reservoir. Coupled with the performance-proven MicroScout service, the design is enhanced with additional components to achieve increased stimulation. This two-part system delivers an additional microparticle product (much smaller than original MicroScout service particles) deeper into microfractures and small fissures.
Functioning similar to MicroScout service, the microparticles in the MicroScout Plus service are designed to flow where the stimulation fluid flows. At the conclusion of fracturing operations, a large percentage remains suspended in the fluids and is able to leak off deeper into the reservoir. Once the matrix closes, the microproppant has been placed throughout the created and natural fracture network, allowing for enhanced conductive complexity. MicroScout Plus service can enable stimulation of a larger portion of the created fracture network than has previously been possible, enabling recovery of resources previously untapped by conventional materials.

**EXPANSION OF THE CONNECTED, CONDUCTIVE FRACTURE NETWORK CAN IMPROVE PRODUCTION**

Industry data suggests that, without having an effective means to keep reservoir microfractures open, the well recovery factor and decline curve can suffer. MicroScout service combines proprietary fracturing processes that can greatly increase the complexity of conductive hydraulic fracture networks in tight shale formations, thus maximizing the producing reservoir contact area to enhance microfracture stimulation and recovery factors. Results of an 11-well field study in the Woodford shale play shows that MicroScout service has provided significant uplift to condensate and gas production over the first year of production. A Wolfcamp well treated with MicroScout service in the Permian Delaware basin is outperforming comparable offsets in both initial oil production (by 26 percent) and initial gas (by over 100 percent).

Conventional materials are unable to stimulate secondary fractures, resulting in a reduction of stimulated reservoir volume. MicroScout service stimulates secondary fractures that are too small for conventional proppant to enter. MicroScout Plus service penetrates even deeper, allowing for enhanced conductive complexity.

For more information, contact your local Halliburton representative or visit us on the web at www.halliburton.com